



Faunistic study of the fruit flies (Diptera, Tephritidae) in the United Arab Emirates, with a new record and an updated checklist

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ABSTRACT. Collecting of tephritid fruit flies at four sites in the United Arab Emirates (UAE), resulted in the presence of eleven species. *Capparimyia savastani* is reported for the first time from UAE fauna. The number of UAE Tephritidae fauna is increased to 34. The first checklist of fruit flies of UAE is also provided.

Key words: Fauna, Arabian Peninsula, Tephritidae, UAE, new record, checklist

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Introduction

With about 5,000 described valid species, the Tephritidae (true fruit flies) is one of the largest family of acalyptrate Diptera (Pape et al., 2011). Most tephritid species are phytophagous and some species are serious pests in agricultural ecosystems (White & Elson-Harris, 1992). Some species are beneficial and effectively used in biological control programs (White & Elson-Harris, 1992).

UAE is a country in South West Asia covering an area of 83,600 km². It is bordered in the north by the Persian Gulf and Gulf of Oman; in the west by Saudi Arabia and in the east by Oman. It occupies a spectacular position near the junction of the Palaearctic and Afrotropical zoogeographic regions. The first taxonomic studies in the UAE fauna literature were mainly focused on insect pests (van Harten, 2005; White, 2006). Later, the number of species recorded from UAE was increased by Merz (2008, 2011) where he described *Euarestella korneyevi* Merz, 2011, *Euarestella vanharteni* Merz, 2008, *Oxyaciura nigra* Merz, 2008 and recorded dozens of species. Thirty-three species of fruit flies were known up to date from UAE. In the studies on fruit flies fauna of the UAE, several specimens of fruit flies were collected, and one species identified as a new record for UAE fauna.

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Material and methods

Material was collected by a standard sweeping net. The main study site was the western flank of Jebel Hafeet, in Al Ain, UAE, where most of the specimens were collected in 2014, 2015, 2018 and 2020. The other sites were Wadi Wurayah, Fujairah, Green Mubazzarah and a private garden in Muwajji, Al Ain. Collected material was stored in 75% isopropyl alcohol or pinned and deposited in the insect collection of Jalal Afshar Zoological Museum, University of Tehran, Iran (JAZM) and personal collection of the first author (SMNC). Species were identified according to [Hendel \(1927\)](#), [Freidberg & Kugler \(1989\)](#), [White & Elson-Harris \(1992\)](#), [Merz \(2002\)](#), [De Meyer & Freidberg \(2005\)](#) and [White \(2006\)](#). Morphological terminology follows [White et al. \(1999\)](#). Field photos ([Fig. 1](#)) were taken using Nikon D850 body with Nikon AF-S Micro Nikkor 105mm f/2.8G IF-ED VR, along with R1 Wireless Close-Up Speedlight System. Stack photos of pinned specimens ([Fig. 3](#)) were taken using Nikon D850 body, using Laowa 25mm f2.8 2.5-5X ultra-macro lens and Laowa 60mm f/2.8 2X ultra-macro lenses.

Results

The subfamilies, tribes and species are listed in alphabetic order. Detailed morphological descriptions are not given. For further information, refer to the works of [Hendel \(1927\)](#), [White \(2006\)](#), [Freidberg & Kugler \(1989\)](#) and [Merz \(2008\)](#).

Subfamily Trypetinae Loew, 1861

Bactrocera zonata (Saunders, 1842) ([Fig. 2C, D](#))

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♀, 24.III.2020, swept on *Ochradenus aucheri*. leg. Huw Roberts (JAZM).

Distribution: This species is native to Oriental region (India, Bangladesh, Laos, Myanmar, Pakistan, Sri Lanka, Thailand and Vietnam) and later introduced to USA, North Africa (Libya, Egypt and Sudan), Mauritius and Réunion, Arabian Peninsula, Iran and Israel ([Norbom et al., 1999](#); [White, 2006](#); [Merz, 2008](#); [CABI, 2020](#)).

Capparimyia savastani (Martelli, 1911) ([Fig. 2A, B](#))

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♂, 6.XII.2018, swept on *Capparis sinaica* Veillard. leg. Huw Roberts (SMNC).

Distribution: Spain, France, Italy, Greece, Malta, Cyprus, Morocco, Algeria, Tunisia, Libya, Egypt, Israel, Lebanon, Jordan, Iran, Oman, Yemen and Pakistan ([Freidberg & Kugler 1989](#); [Norbom et al., 1999](#); [Donati & Belcari, 2003](#); [De Meyer & Freidberg, 2005](#); [Merz et al., 2006](#); [Miranda et al., 2008](#); [Papachristos et al., 2009](#); [Ghahari, 2013](#); [Moussa & Yammouni, 2014](#); [El Harym & Belqat, 2017](#); [Demetriou & Kryfos, 2020](#)) (new record for UAE) ([Fig. 1](#)).

Host plants: *Capparis sinaica* Veillard, *C. spinosa* L. and *C. aegyptia* Lam. ([Freidberg, 1990](#); [Freidberg & Kugler, 1989](#)).

Diagnosis: This species can be distinguished from other species of *Capparimyia* with the following characters: Arista pubescent; first flagellomere rounded apically; two pairs of orbital setae; black postpronotal spot restricted to the base of postpronotal seta; white medial scutal vitta extending anteriorly beyond transverse suture and joining posteriorly to white band in basal part of scutellum; white medial vitta extending anteriorly to or just beyond transverse suture; black apical scutellar spots narrowly separated along entire length ([De Meyer & Freidberg, 2005](#)).



Figure 1. Worldwide distribution map of *Capparimyia savastani* (Diptera: Tephritidae).

Dacus ciliatus Loew, 1862 (Figs. 3A, 2E, 2F)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♂, 1♀, 15.I.2015, swept on *Calotropis procera* and *Ochradenus arabicus*; 1♂ 7.4.2020, same locality, leg. Huw Roberts (JAZM, SMNC).

Distribution: Senegal E to Somalia, S to South Africa, Madagascar, Arabian Peninsula, Egypt, Israel E to Burma (Norrbon et al., 1999; Merz, 2008).

Remarks: This species is similar to *D. frontalis* Becker; the distribution of these two species overlaps in many Afrotropical countries. The most important character to differentiate them is the color of anatergite and katatergite which are whitish yellow in *D. frontalis* (only katatergite is yellowish in *D. ciliatus*). Some specimens of *D. ciliatus* from Iran and Morocco showed intermediate coloration with small yellowish spot on anatergite (Mohamadzade & El Harym, unpublished data), and indicated that molecular analysis is needed to understand the taxonomic position of these possibly cryptic species.

Dacus longistylus Wiedemann, 1830 (Fig. 2G, H)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♂, 2♀♀, 31.I.2020, swept on *Calotropis procera*, leg. Huw Roberts (JAZM).

Distribution: Africa, Middle East to Yemen (Norrbon et al., 1999; White, 2006).

Dacus persicus Hendel, 1927 (Fig. 3B)

Specimens examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♂ 14.XII.2013; same locality, 1♀ 17.10.2014; same locality, 1♂, 1♀, 15.I.2015 (SMNC); same locality, 1♂ 17.XII.2015; Wadi Wurayah, Fujairah (24°5'50.93" N, 55°45'8.63" E), 1♀ 10.IV.2014, swept on *Calotropis procera*, leg. Huw Roberts (JAZM).

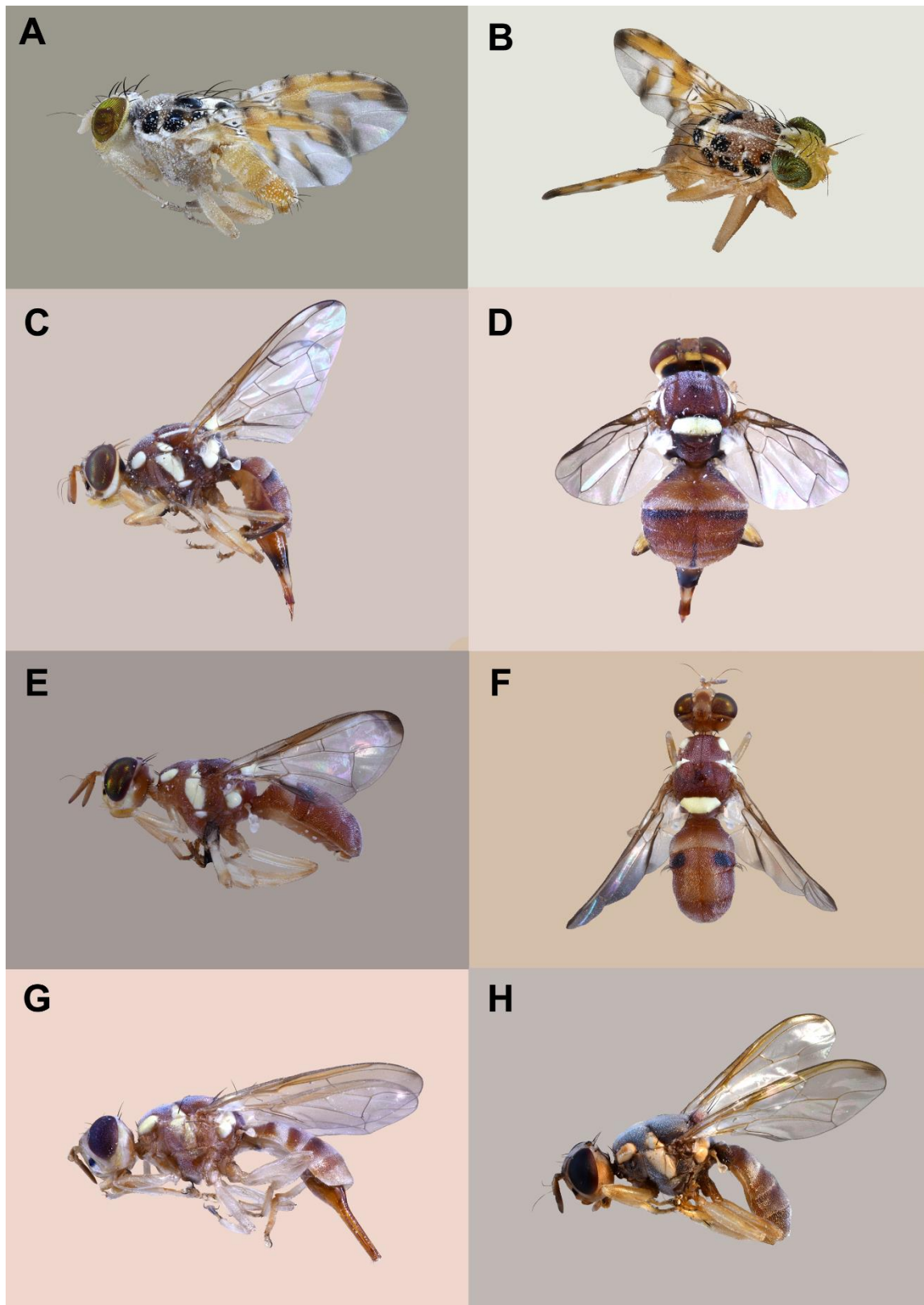


Figure 2. General habitus of fruit flies (Diptera: Tephritidae) collected in UAE. **A-B.** *Capparimyia savastni*, **C-D.** *Bactrocera zonata*, **E-F.** *Dacus ciliatus*, **G-H.** *D. longistylus*.

Distribution: Arabian Peninsula, Iran, Pakistan, India and Sri Lanka (Norrbon et al, 1999; Merz, 2008).

Remarks: This species is similar to *D. longistylus* but the wing marking is reduced and has shorter ovipositor than *D. longistylus* (in *D. pericus*, ovipositor is shorter than abdominal tergite 3-5 combined but in *D. longistylus* the ovipositor is as long as abdomen but there is a large variation in the length of ovipositor in both species). There is a variation in the presence of lateral postcuticular yellow vitae on the scutum of both species. They also have same host plant (*Calotropis procera*) but as White (2006) also suggested before, *D. persicus* might be a geographic variant of *D. longistylus* and the size variation may be due to differences between host fruits they consume in different geographic regions. Molecular analysis is needed to understand the taxonomic position of these possibly cryptic species.

Subfamily Tephritinae Newman, 1834

Goniurellia lacerata (Becker, 1913) (Fig. 3C, D)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♀, 3.II.2015, swept on *Calotropis procera*, leg. Huw Roberts (SMNC).

Distribution: Egypt, Iran and UAE (Norrbon et al., 1999; Merz, 2008).

Goniurellia octoradiata Merz, 2002 (Fig. 3E)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♂, 19.III.2014, swept on *Pulicaria glutinosa*; same locality, 1♂, 2.V.2020, leg. Huw Roberts (SMNC).

Distribution: Oman and UAE (Merz, 2002, 2008).

Goniurellia tridens (Hendel, 1910)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 1♀, 16.XI.2015, leg. Huw Roberts (SMNC).

Distribution: Israel, Armenia, Turkmenistan, Uzbekistan, Iraq, Iran, Saudi Arabia, UAE, Pakistan and India (Zaitzev, 1947; Norrbom et al., 1999; Korneyev & Dirlbek, 2000; Merz & Dawah, 2005; Merz, 2008)

Goniurellia sp. (Fig. 3F)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), swept on *Pulicaria glutinosa*, 1♀, 18.III.2014, leg. Huw Roberts (SMNC).

Remarks: This specimen is morphologically and in wing pattern similar to the *G. octoradiata* Merz, but smaller hyaline spot in r_1 cell is penetrated into r_{2+3} and the abdominal tergites are pale reddish brown (dark gray in *G. octoradiata*). More material is needed in order to study the variability of different specimens.

Metasphenisca negeviana (Freidberg, 1974) (Fig. 3G)

Material examined: UAE, Green Mubazzarah, Al Ain (24°5'50.93" N, 55°45'8.63" E), 1♀, 8.IV.2010, found on *Blepharis ciliaris*, leg. Huw Roberts (SMNC).

Distribution: Israel, Egypt, Jordan, Saudi Arabia UAE, Yemen (Freidberg & Kugler, 1989; Korneyev & Dirlbek, 2000; Merz & Dawah, 2005; Merz et al, 2006; Merz, 2011)

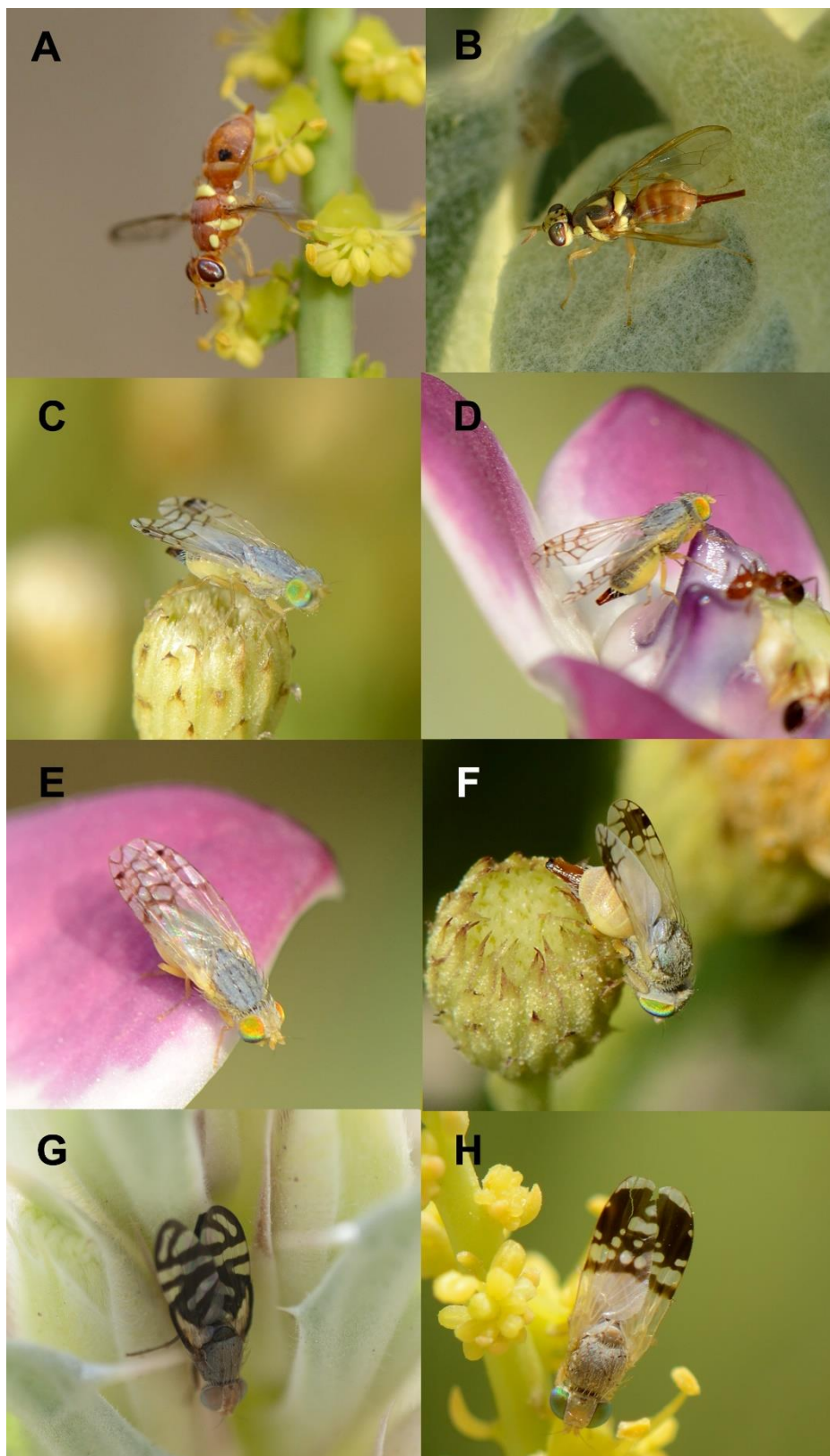


Figure 3. General habitus of fruit flies (Diptera: Tephritidae) collected in UAE. **A.** *Dacus ciliatus*, **B.** *D. persicus*, **C-D.** *Goniurellia lacerata*, **E.** *G. octoradiata*, **F.** *Goniurellia* sp., **G.** *Metasphenisca negeviana*, **H.** *Trupanea pulcherrima*.

Trupanea pulcherrima (Eflatoun, 1924) (Fig. 3H)

Material examined: UAE, Ain Al Waal, Al Ain (24°4'14.81" N, 55°44'49.54" E), 2♀, 6.II.2014, swept on *Ochradenus arabicus*, leg. Huw Roberts (JAZM, SMNC).

Distribution: Algeria, Tunisia, Egypt, Israel, Saudi Arabia, UAE and Iran (Norrbom et al., 1999; Merz, 2008; El Harym & Belqat, 2017).

Discussion

In this study eleven species of fruit flies were collected from 3 sites in the UAE. Ten of them were identified at species level, and one species of *Goniurellia* remains unnamed. Merz (2011) also reported that several undescribed *Goniurellia* are represented in the UAE but the brief descriptions of those samples differ to the newly collected one in this study. *Capparimyia savastani* is newly reported for UAE and the checklist of the family Tephritidae in UAE increases to 34 species (Table 1). Based on the distribution map (Fig. 1), it is predicted that this species can be distributed in other Mediterranean region and the Middle East countries.

Table 1. Checklist of the fruit flies (Diptera: Tephritidae) of UAE.

No.	Species	References
Subfamily Trypetinae		
1	<i>Bactrocera cucurbitae</i> (Coquillett, 1899)	Merz, 2011
2	<i>Bactrocera dorsalis</i> (Hendel, 1912)	van Harten, 2005
3	<i>Bactrocera zonata</i> (Saunders, 1842)	White, 2006
4	<i>Capparimyia savastani</i> (Martelli 1911)	Present study
5	<i>Carpomya incompleta</i> (Becker, 1903)	van Harten, 2005
6	<i>Carpomya vesuviana</i> Costa, 1854	van Harten, 2005
7	<i>Dacus ciliatus</i> Loew, 1862	van Harten, 2005
8	<i>Dacus longistylus</i> Wiedemann, 1830	van Harten, 2005
9	<i>Dacus persicus</i> Hendel, 1927	White, 2006
10	<i>Dacus semisphaereus</i> Becker, 1903	Merz, 2008
11	<i>Dacus vertebratus</i> Bezzi, 1908	van Harten, 2005
12	<i>Neoceratitis eflatouni</i> (Hendel, 1931)	Merz, 2008
Subfamily Tephritinae		
13	<i>Acanthiophilus helianthi</i> (Rossi, 1794)	Merz, 2008
14	<i>Aciura afghana</i> (Hering, 1961)	Merz, 2008
15	<i>Euarestella korneyevi</i> Merz, 2011	Merz, 2011
16	<i>Euarestella</i> sp. near <i>kugleri</i> Freidberg, 1974	Merz, 2008
17	<i>Euarestella vanharteni</i> Merz, 2008	Merz, 2008
18	<i>Goniurellia lacerata</i> (Becker, 1913)	Merz, 2008
19	<i>Goniurellia longicauda</i> Freidberg, 1980	Merz, 2008
20	<i>Goniurellia octoradiata</i> Merz, 2002	Merz, 2008
21	<i>Goniurellia tridens</i> (Hendel, 1910)	Merz, 2008
22	<i>Hyalotephritis planiscutellata</i> (Becker, 1903)	Merz, 2008
23	<i>Katonaia aida</i> Hering, 1938	Merz, 2008

Table 1. Continued.

No.	Species	References
24	<i>Metasphenisca negeviana</i> (Freidberg, 1974)	Merz, 2011
25	<i>Metasphenisca</i> sp. near <i>tetrachaeta</i> (Bezzi, 1918)	Merz, 2008
26	<i>Oxyaciura nigra</i> Merz, 2008	Merz, 2008
27	<i>Oxyaciura tibialis</i> (Robineau-Desvoidy, 1830)	Merz, 2008
28	<i>Rhochmopterum</i> sp.	Merz, 2011
29	<i>Schistopterum moebiusi</i> Becker, 1903	Merz, 2008
30	<i>Sphaeniscus trifasciatus</i> Korneyev & J. Diribek, 2000	Merz, 2011
31	<i>Trupanea amoena</i> (Frauenfeld, 1857)	Merz, 2008
32	<i>Trupanea pulcherrima</i> (Efllatoun, 1924)	Merz, 2008
33	<i>Trupanea stellata</i> (Fuesslin, 1775)	van Harten, 2005
34	<i>Trupanea tubulata</i> Munro, 1964	Merz, 2011

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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مطالعه فونستیک مگس‌های میوه (Diptera: Tephritidae) در امارات متحده عربی، همراه با گزارش جدید یک گونه و چک‌لیست گونه‌ها

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چکیده: براساس بررسی انجام شده روی فون مگس‌های خانواده Tephritidae در چهار منطقه در امارات متحده عربی، ۱۱ گونه جمع‌آوری گردید. گونه *Capparimyia savastani* برای نخستین بار از کشور امارات متحده عربی گزارش می‌گردد. تعداد گونه‌های این خانواده در کشور امارات متحده عربی به ۳۴ گونه افزایش یافت. همچنین اولین چک‌لیست گونه‌های خانواده Tephritidae در امارات متحده عربی نیز تهیه شد.

واژگان کلیدی: فون، شبه جزیره عربستان، Tephritidae، امارات متحده عربی، گزارش جدید، چک‌لیست